PSYCHE

VOL. XXI. AUGUST, 1914. No. 4

HYBRID BUTTERFLIES OF THE GENUS BASILARCHIA.

By W. L. W. Field,
Milton, Massachusetts.

On August 19, 1910, at Alstead Center, New Hampshire, several females of *Basilarchia archippus*, reared in captivity, were placed in a breeding-cage with males of *B. arthemis* captured in the neighborhood. The butterflies were fed with dilute honey applied to heads of *Prunella* and clover.

On August 20, a pair was found in copulation, remaining in that state for about half an hour. Afterward the female was removed from the cage and placed on willow shoots out-of-doors, under a cheese-cloth covering. Every leaf of the willow had been inspected; a wooden baseboard was provided, and all crevices were tightly packed with cotton. The butterfly was a crippled one, and found difficulty in balancing herself upon the leaves. Some of her eggs were laid upon leaves in the normal way, a few on stems, and many on the cheese-cloth in the vicinity of the foliage. In seven days she laid sixty-two eggs, and then died.

The larvæ began hatching nine days after the beginning of oviposition, but in all only nineteen appeared; and it was noted that none of these came from eggs laid toward the end of the period of oviposition.

The larvæ grew slowly, but were favored by unusually mild weather, and began to construct hibernacula early in October. On October 21, sixteen were found hibernating; the others had disappeared. The hibernating larvæ were transferred to a small outdoor shelter near my laboratory in Milton, Mass.

On April 27, 1911, they were placed on willow shoots under a cheese-cloth shelter. The willow shoots had been started indoors and kept under close scrutiny, and were known to be free from other larvæ.

On May 7, the larvæ began to issue from their hibernacula. In all ten appeared, but one was very belated and weak, and soon

died. One other was injured by a fall after pupating, and died. Eight, all males, reached the imago stage successfully. The small size of the pupa which died warranted the surmise that it, also, was a male.

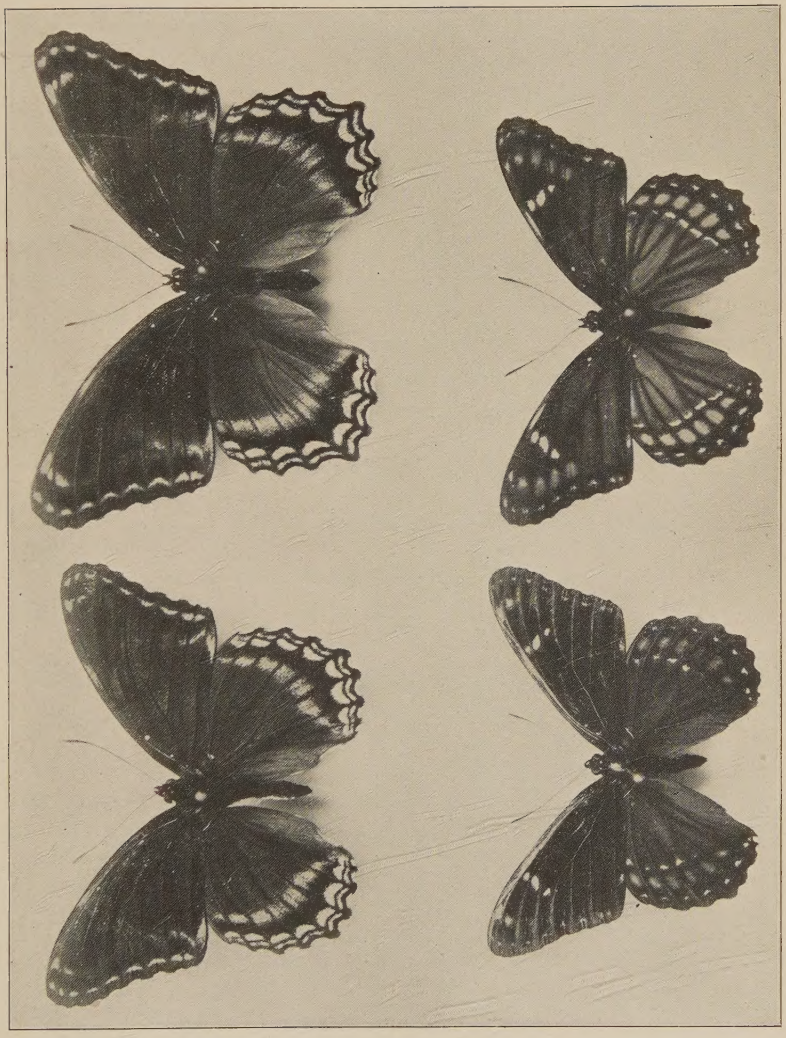
The butterflies were all closely like the type specimen of *arthechippus* in the Museum of Comparative Zoölogy, described by Scudder (1889), and the two specimens captured on the wing in Alstead, N. H., and deposited in the same collection. The older specimens are likewise all males.

Diligent efforts were made to mate these butterflies with females of allied species. *Arthemis*, *archippus*, *astyanax* and *proserpina* were all tried, in different breeding cages and in various numbers and groupings, but no mating occurred. Both sexes, however, in several instances showed marked sexual excitement, and their failure to copulate is probably to be ascribed to some unfavorable element in the illumination of the cages at critical moments.

On August 30, 1910, at Alstead Center, a female *Basilarchia astyanax*, reared in captivity from a larva obtained near Brooklyn, N. Y., mated with a male *arthemis* captured in Alstead. The duration of copulation was fifty-five minutes. The female was afterward imprisoned over carefully-inspected wild cherry shoots, on the leaves of which she deposited eighty-two eggs. Oviposition was begun on September 5, and extended over nine days.

The eggs were extremely slow in hatching, and no exact count of the young larvæ was obtained. Forty-one survived the early frosts, and the construction of hibernacula began on October 21. The hibernating larvæ were kept through the winter in an outdoor shelter in Milton, Mass., and bagged out on inspected shoots of wild cherry April 27, 1911. On May 7 they began to emerge from their nests, but their number had dwindled to ten when the count was made. All of the ten pupated successfully, but only eight reached the imago state: five males and three females, all rather dark examples of *proserpina*.

Efforts to breed these butterflies with one another were unsuccessful. Attempts were then made to mate them with *arthemis* and *astyanax*, the two parent species; and the females were introduced into the boxes containing the males of *arthechippus*, already described; but no copulation occurred.



Field—Butterflies of the Genus Basilarchia.

Digitized by the Internet Archive
in 2024

https://archive.org/details/psyche_1914-08_21_4

The accompanying plate shows a male and a female of *proserpina*, and two males of *arthechippus*, chosen from the two series just described. These specimens, with others more worn and disfigured by their prolonged detention in the breeding cages, are in the Museum of Comparative Zoölogy at Harvard University. The tattered remains of the parents of both broods will be found in the same case.

Publication of this record has been delayed in the hope of obtaining new hybrids and breeding them to further generations; but though success seemed very close in the experiments of 1912 and 1913, no progress has been made. The work has been resumed with abundant material, and the present summer may witness some definite results. At all events, the hybrid character of *arthechippus* and *proserpina* is now established; and observations already published (Field, 1910) make it clear that *proserpina* will at least breed with one of the parent species. Increased interest thus attaches to the butterflies of this always interesting genus.

BIBLIOGRAPHY.

Bateson, W.

1913. Problems of Genetics. New Haven: Yale University Press.

Field, W. L. W.

1904. Problems in the genus Basilarchia. PSYCHE, xi, 1–6, 3 pl.

1910. The offspring of a captured female *Basilarchia proserpina*. PSYCHE, xvii, 87–89, 1 pl.

Scudder, S. H.

1889. The Butterflies of the Eastern United States and Canada, with special reference to New England. Cambridge: published by the author.

NOTE ON *Linognathus forficula* KELLOGG AND PAINE.

Through recent correspondence with H. Fahrenholz of Hannover, Germany, an active worker with the Anoplura, the writer has received information which concerns the nomenclature of *Linognathus forficula*, described by Kellogg and Paine from *Cervicapra arundinum*.[1] The generic position of Rudow's *Hæmatopinus forficulus*[2] has, on account of an insufficient description, been considered doubtful. However, Fahrenholz has come into possession of a series of specimens of Rudow's species which reveals the fact that it must be placed in the genus *Linognathus*. The name *L. forficula*, therefore, as applied to Kellogg and Paine's species, must give way, on account of priority, and is herewith substituted by the name *Linognathus fahrenholzi*.

J. H. PAINE.

---

[1] Kellogg, V. L. and Paine, J. H. Anoplura and Mallophaga from African Hosts; Bull. Ent. Research, Vol. II, p. 147, July, 1911.

[2] Rudow, Zeitschr. f. gew. Naturw. Vol. 34, p. 169 (1869).

THE AMERICAN SPECIES OF MYRMICA ALLIED TO *M. RUBIDA* LATREILLE.[1]

By William Morton Wheeler.

The large and handsome *Myrmica rubida* Latreille remained for many years the only species of an aberrant group within its genus. In 1894 Emery described the first American species of this group, *M. mutica*, from Denver, Colo., and five years ago I added a species from California, *M. bradleyi*. Two additional species, *M. aldrichi* and *hunteri*, from Idaho and Montana respectively, have since come to light and are described in the following pages. Thus all of the American forms are known only from the mountainous regions of the Western States. The single Old World species occurs in similar localities in Central and Southern Europe and as far east as the Caucasus in Asia Minor and Eastern Siberia. I have had abundant opportunity to study *M. rubida* in the Rhone valley and other localities in Switzerland and *M. mutica* at Colorado Springs and in neighboring localities in Colorado. Both species have very similar habits. They usually nest in sandy creek bottoms under stones or in small crater nests. The workers of both species sting severely, especially the Eurasian *M. rubida*, but neither is very aggressive. The pupæ have a peculiar canary yellow color, unlike that of any other species of the genus.

As all five of the species now recognized are closely related to one another and constitute a sharply defined group, I propose to separate them from *Myrmica sens. str.* as a subgenus, *Oreomyrma, subgen. nov.*, with *M. rubida* Latr. as the type (Fig. 1a). The workers and females in this subgenus are distinguished by having the epinotum unarmed, the antennal club 5-jointed and the mandibles with two large apical and 12–14 minute basal teeth. The male has no club to the antennal funiculi and the mandibles are like those of the worker. In *Myrmica sens. str.*, with the type *M. rubra* L., the antennal club of the worker and female is 3-or 4-jointed, the mandibles have only 7–12 teeth and the epinotum is armed with a pair of spines. The males have a distinct 4- or 5-jointed antennal club, and their mandibles are only 4–8-toothed.

---

[1]Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 79.

The males and females of only two of the species (*M. rubida* and *mutica*) are known. The workers of the five species may be readily separated by means of the following key:

1. Anteroventral surface of postpetiole with a pointed or rounded tubercle or protuberance 2
   Anteroventral surface of postpetiole flat or at any rate without a tubercle or protuberance 3
2. Large species (worker, 7–8.5 mm.; female, 9.5–12 mm., male, 8.5–10 mm.) epinotum subdentate; postpetiole with a small, pointed, anteroventral tubercle; deep red, posterior portion of first gastric segment blackish *rubida* Latreille.
   Smaller species (worker, 4–6 mm.), anterior border of clypeus entire, epinotum not subdentate, rounded in profile; anteroventral portion of postpetiole much more protuberant 4
3. Deep red; petiole subopaque ..... *mutica* Emery.
   Black, with red thorax, petiole and postpetiole; both petiole and postpetiole shining, more slender ..... *bradleyi* Wheeler.
4. Yellow; anteroventral tubercle of postpetiole conical or pointed . *aldrichi* sp. nov.
   Deep red; spot on vertex and posterior portion of first gastric segment black; anteroventral tubercle of postpetiole more rounded ..... *hunteri* sp. nov.

Myrmica (Oreomyrma) mutica Emery (Fig. 1 d).

Myrmica mutica Emery, Zoöl. Jahrb. Abth. f. Syst. VIII, 1894, p. 311 ☿ .

Worker: Length, 4–6 mm.

Head subrectangular, as broad as long, with straight lateral borders and rounded posterior corners. Eyes at the middle of the sides. Clypeus convex, its anterior border very feebly sinuate in the middle. Mandibles with two large apical and about a dozen minute basal teeth. Antennal scapes, rather strongly curved and slightly flattened at the base, scarcely reaching beyond the posterior corners of the head. Funicular club 5-jointed. Thorax in profile with rounded pronotum and the mesonotum gently sloping to a rather deep constriction in front of the epinotum, which has a subequal base and declivity, the former feebly convex, the latter sloping and nearly straight. Petiole in profile longer than high, its node bluntly rounded, with concave anterior and convex posterior slopes; ventral surface of peduncle in front with a small, acute tooth. Postpetiole scarcely longer than broad, a little broader behind than in front, somewhat broader than the petiole; its ventral surface in profile straight. Gaster a little larger than the head. Legs long, tibiæ and femora feebly clavate.

Subopaque; dental border of mandibles, postpetiole, gaster and legs shining. Mandibles, frontal area and front longitudinally rugose; remainder of the head longitudinally and rather indistinctly punctate-rugulose. Thorax finely rugose, longitudinally on the pleuræ, pro- and mesonotum, transversely and more coarsely on the epinotum. Petiole and ventral portion of postpetiole finely and densely punctate. Gaster and legs with small, scattered, piligerous punctures.

Hairs white, erect or suberect, coarse, rather short, abundant on all parts of the body, legs and scapes.

Ferruginous red; gaster slightly paler; frontal area, and in some specimens also the antennal clubs, infuscated; mandibular teeth black.

Female: Length, 6.5–7.5 mm.

Closely resembling the worker. Postpetiole in some specimens opaque rugulose, or with only the node smooth and shining. Mesonotum and scutellum sharply and regularly longitudinally rugose, the former with an anteromedian and a pair of parapsidal blackish streaks. Wings grayish hyaline; veins pale brown, stigma dark brown.

Male: Length, 6–7 mm.

Head, including the eyes and excluding the mandibles, distinctly broader than long, rounded behind. Mandibles similar to those of the worker, with two large apical and numerous minute basal teeth. Clypeus very convex, with entire anterior border. Antennæ slender; scapes very short, not longer than the second funicular joint; which is three times as long as the first and of the same length as the succeeding joints. There is no differentiated club. Thorax rather small, narrower than the head through the eyes, with very distinct Mayrian furrows. Scutellum convex, epinotum, petiole and postpetiole much as in the worker. Gaster more slender, with the genital appendages proportionally larger and more exserted than in *M. rubida.*

Shining; head opaque, indistinctly punctate and longitudinally rugulose; thorax subopaque, more shining above, longitudinally rugose-punctate even on the epinotum. Sides and ventral portions of petiole finely and densely punctate.

Hairs much as in the worker but more delicate and flexuous.

Black; dental borders of mandibles, tibiæ and tarsi brown or sordid yellowish; gaster red, often brownish in the middle above; base of first segment sometimes black or all of the gaster, except the base of the first segment, black. In other specimens the postpetiole is red. Wings colored as in the female.

Colorado: Denver; type locality (Theo. Pergande); Colorado Springs, Salida, Buena Vista and Wild Horse, 6000-7000 ft. (Wheeler); Canyon City (Rev. P. J. Schmitt).

New Mexico: (Ern. André.).

Utah: Salt Lake County (R. V. Chamberlin), as the host of the peculiar xenobiotic ant, *Symmyrmica chamberlini* Wheeler.

Washington: Olympia (T. Kincaid); Ellensburg and Pullman (W. M. Mann).

Alberta: McLeod (C. G. Hewitt).

British Columbia: Dog Lake, Penticton (C. G. Hewitt).

Myrmica (Oreomyrma) bradleyi Wheeler. (Fig. 1 c.)

Myrmica bradleyi Wheeler, Journ. N. Y. Ent. Soc. XVII, 1909, p. 77, ♀.

Myrmica (Oreomyrma) aldrichi sp. nov. (Fig. 1 b.)

Worker: Length 5–6 mm.

Head subrectangular, a little longer than broad, with nearly straight sides and posterior border and rounded posterior corners. Mandibles and antennæ as in

M. mutica. Clypeus convex, its anterior border very feebly sinuate in the middle. Frontal area indistinct. Thorax similar to that of *mutica*, but the epinotum with its base feebly and evenly convex and fully twice as long as the distinctly concave declivity. Petiole laterally compressed ventrally, with a small, acute tooth near the anterior end of the peduncle, its node from above subelliptical, longer than broad, in profile with concave anterior and slightly convex posterior slopes. Postpetiole from above but little broader than the petiole, slightly longer than broad, a little broader behind than in front; in profile convex above, especially behind, below with a prominent conical or pointed protuberance near its anterior end.

Mandibles opaque, finely longitudinally striated, their dental border smooth and shining. Head and thorax opaque, longitudinally rugulose-punctate, posterior portion of clypeus, vertex, occiput and pronotum above smooth and shining. Epinotum transversely rugulose. Gaster, legs, petiolar and postpetiolar nodes smooth and shining, with sparse, minute, piligerous punctures; petiole and postpetiole on the sides and below subopaque; finely and densely punctate.

Hairs white, erect, rather short; covering the body, legs and scapes as in *M. mutica.*

Brownish yellow; dental borders of mandibles and antennal clubs pale brown.

Described from sixteen specimens taken by Prof. J. M. Aldrich at Moscow, Idaho.

At first sight this species may be readily mistaken for an immature *M. mutica* on account of its yellow color, but on closer inspection it is easily distinguished by the shape of the epinotum and postpetiole and the smooth front, occiput, pronotum and petiolar mode.

Myrmica (Oreomyrma) hunteri sp. nov. (Fig. 1 c).

Worker: Length 4–6 mm.

Closely related to *M. aldrichi* but differing in the following characters: Body and appendages brownish red or ferruginous, with a large, black, subtriangular spot on the vertex and a band of the same color across the posterior portion of the first gastric segment. Frontal area, posterior clypeal suture, antennal clubs and dental border of mandibles more or less infuscated. Sculpture sharper and coarser than in *aldrichi.* Upper surface of head with coarse, scattered punctures in addition to the rugæ. Smooth areas on the head, thorax and pedicel much as in that species. Hairs pale yellow instead of white. Anterior clypeal border entire. Base of epinotum somewhat flattened, anteroventral protuberance of postpetiole broadly rounded and not conical or pointed.

Described from a dozen specimens taken by Dr. S. J. Hunter from a couple of nests on the slopes of two mountains on the Madison River, nearly opposite the mouth of Beaver Creek, Montana, at an altitude of about 7,500 feet. The nests were in shaley earth and apparently of the crater type.

Of all the American species of *Oreomryma, hunteri* is most closely related to the palearctic *rubida* in coloration and sculpture. Per-

haps it should be regarded merely as a subspecies of *aldrichi*, but its exact status can be determined only with the aid of additional material and with specimens of the males and females of both forms.

Further researches in the mountains of the northwest will probably bring to light additional species of *Oreomyrma*. The number and distribution of those at present known indicate that the Rocky Mountains are the center of distribution of the subgenus and that *M. rubida* may have reached the Old World during the Tertiary by way of the Behring Strait land-bridge.

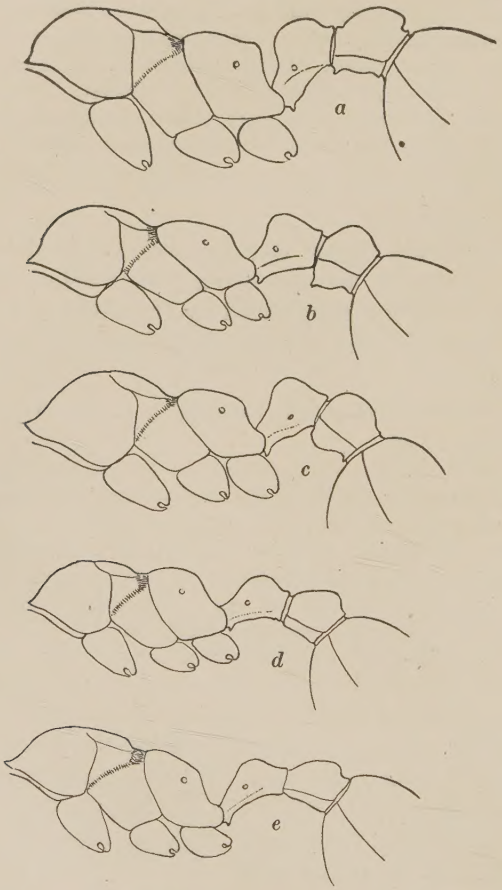


Fig. 1. *a*, Thorax and pedicel of *Myrmica* (*Oreomyrma*) *rubida* Latr. in profile; *b*, of *M.* (*O.*) *aldrichi* sp. nov.; *c*, of *M.* (*O.*) *hunteri* sp. nov.; *d*, of *M.* (*O.*) *mutica* Emery; *e*, of *M.* (*O.*) *bradleyi* Wheeler.

THE DISCOVERY OF ECLIMUS HARRISI IN THE WHITE MOUNTAINS, N. H.

By Charles W. Johnson,
Boston Society of Natural History.

This interesting species has long been known only by the type, a male, in the Harris collection, in the Boston Society of Natural History. It bears the label, "H. Gray," without date or locality. It was described by Osten Sacken as *Epibates harrisi* in his Western Diptera (Bull. U. S. Geol. Survey, Vol. 3, p. 273, 1877). In the note following the description he says: "It is probably from the Northern United States as are nearly all the specimens in the collection." On page 271 in the table of species it is referred doubtfully to the "Atlantic States (?)," but in the table of contents where all the species are arranged systematically with localities, "Massachusetts" is given without a question. I am unable to find any authority for this and doubt if Osten Sacken made the table of contents.

During the meeting of the New England Federation of Natural History Societies at the Glen House the first week in July, frequent collecting trips were made to various parts of the mountains. On July 8, I captured a male of *Eclimus harrisi* on the flowers of the blackberry on the Mount Washington Road near the Raymond trail, just below the two-mile post, at an elevation of about 2,600 feet. This resembles the type in every respect except that its length is 12 mm. while the type measures 14 mm. A female of this species was taken by Mr. C. A. Frost, July 6, along the railway, above Base Station.

A REVIEW OF OUR SPECIES OF TRIGONOMETOPUS (DIPTERA; LAUXANIIDÆ).

By Frederick Knab,
Bureau of Entomology, Washington, D. C.

The Lauxaniid genus *Trigonometopus* is easily recognizable by the peculiar shape of the elongate head, triangular in profile, with the frons horizontal and the face strongly receding, the antennæ inserted at the apex of the triangle. Four species have been

described from America, three of which are represented in the national collection by single specimens. Four other specimens in the collection belong to two species hitherto undescribed and are now characterized. The European species, *Trigonometopus frontalis* Meigen, frequently has the last section of the fourth vein appendiculate; none of the specimens before me show this peculiarity. The American species may be separated as follows:

1. Wings subhyaline, two round dots on outer section of third vein *punctipennis* Coq.
   Wings not so marked 2
2. Wing pale along the costa, a dark streak medially 3
   Wings not so marked 5
3. Abdomen mostly pale ..... *vittatus* Loew
   Abdomen dorsally black, marked medially with yellow 4
4. Wings with a dark spot on the anterior cross-vein, median stripe of abdomen to tip ..... *albifrons* sp. nov.
   Wings without spot on anterior cross-vein, median stripe of abdomen abbreviated ..... *angustipennis* sp. nov.
5. Wings whitish hyaline, reticulated with fine bars of black between the veins *reticulatus* Johns.
   Wings not reticulate, a dark shade along costa involving second vein *rotundicornis* Will.

Trigonometopus angustipennis sp. nov.

Male: Frons pale brownish, moderately broad, narrowing very slightly anteriorly, the part in front of the eyes not broadened; a dark patch clothed with dense black hairs laterally from eyes to antennæ; occiput dark brown along posterior margins of eyes, a black streak from eyes along lower margin of cheek. Antennæ ferruginous, the third joint compressed, in lateral view broad and rounded; arista long, pale at base, black beyond. Mesonotum and scutellum black, with three narrow, well-defined, longitudinal yellowish stripes, confluent on anterior margin, posteriorly continued over the scutellum. Pleuræ ocher yellow. Abdomen dorsally black, a median yellowish stripe extending to the apex of the fourth segment; sides and venter yellowish. Legs yellowish, the tarsi slightly infuscated. Wings rather narrow, the costal region to the middle of the submarginal cell pale yellowish, subhyaline, the involved veins pale; the rest of the wing smoky, a distinctly darker median streak involving the third and fourth veins and near the tip of the wing extending forward to the costa and involving the tip of marginal cell; all the veins within the smoky zone black, a dark shade along the fifth vein and posterior cross-vein. Length: Body about 4.5 mm., wing 4 mm.

Guadeloupe, West Indies, 3000 feet altitude, 30 July, 1905, one specimen (Aug. Busck).

Type: Cat. No. 18482, U. S. Nat. Mus.

In this species the ocular margins converge slightly anteriorly while in the two species which follow they are distinctly divergent; beyond the bulging eyes the frons is not markedly broadened, as is the case in the other species. The head is also slightly shorter in the portion beyond the eyes. In the single specimen the head is somewhat distorted, nevertheless the differences from *T. albifrons*, the species it most resembles, are obvious and abundant.

Trigonometopus albifrons sp. nov.

Male and female: Frons creamy white, very broad, widening anteriorly, a large dark brown spot densely clothed with black hairs laterally before eyes, scattered black hairs anteriorly diminishing to behind the middle; occiput dark brown along posterior margins of eyes to the cheeks, a dark streak from the eye along the lower margin of the cheek, face white, nearly flat. Antennæ whitish, the third joint tinged with ferruginous, compressed beyond its base, in profile broad and rounded; arista very long, pale near base, black beyond. Thorax narrow; mesonotum broadly blackish brown at the sides, a median yellowish zone occupying nearly half its width and divided by two ill-defined dark stripes into three pale longitudinal stripes. Scutellum blackish brown, with a narrow median and less distinct lateral yellowish stripes. Pleuræ pale yellowish, infuscated on the mesosternum. Abdomen dorsally black, with pale lateral incisions and a median yellowish stripe extending its entire length; venter pale. Legs pale yellowish, the bristles black; tarsi very slightly infuscated. Wings rather broad, the costal region to the middle of the submarginal cell pale yellow, semi-opaque and with the veins pale; posterior portion of wing tinged with grey and with all the veins behind the second black, a darker shade about the cross-veins and broadly along the third vein, particularly distally where it is abruptly produced to the anterior margin at the tip of the second vein. Halteres pale, with infuscated knobs. Length: Body about 4.2 mm., wing 3.5 mm.

San Marcos, Nicaragua, 2 specimens (C. F. Baker); Cacao, Trece Aguas, Alta Vera Paz, Guatemala, 30 March, 1906, one specimen (Schwarz and Barber).

Type: Cat. No 18481, U. S. Nat. Mus.

The specimen from Guatemala differs in some respects. On the wings the anterior expansion of the dark shade reaches the costa before the end of the second vein, thus involving the tip of the marginal cell; the portion of the second vein within the dark shade is black. I attribute no significance to this difference, as the two specimens from Nicaragua, which are surely conspecific, show variation in this respect. In one the dark shade reaches the costa at the tip of the second vein, in the other the pale costal zone extends a short distance beyond the end of the second vein.

Trigonometopus vittatus Loew.

A single specimen before me, taken by Mrs. A. T. Slosson at Biscayne Bay, Florida, agrees with Loew's description in most particulars. The wing coloration indicated by Loew is like that of the species just described. In the present specimen the difference between the yellowish anterior portion of the wing and the smoky posterior portion is but weakly indicated; the dark shade appears to begin behind the third vein, instead of in front of it, thus leaving a pale streak along the anterior margin of the first posterior cell. No trace of the distal extension of the dark shade to the costa at the tip of the second vein, as indicated by Loew, is perceptible, nor is there any strong contrast in the coloration of the veins in the two regions. Another difference occurs in the coloration of the abdomen; this may, however, be due largely to the condition of the specimens, since the insect is said to have an entirely pale abdomen in life. In Loew's specimen the abdominal segments are said to have basal dark bands, while in the specimen before me these bands are apical. It is possible that the Florida specimen represents a distinct species, but the variability shown by the three specimens of *T. albifrons*, and the paucity of material, indicate a conservative course.

PROTHETELY IN THE LARVA OF *PHOTURIS PENNSYLVANICA* DE GEER.

By Francis X. Williams,
Bussey Institution, Harvard University.

The term prothetely (προθεῖν, to run before, and τέλος, completion) was proposed by Kolbe in 1903, who applied it to that condition found in insect larvæ in which the imaginal discs have developed with abnormal rapidity resulting in the production of larvæ with pupal or imaginal characters.

Prothetely, though not of common occurrence, has been noted chiefly in coleopterous larvæ, being there represented by external wing-pads, adult legs, additional antennal joints, modified mouth-parts, abdominal tergites, etc., one or several of these peculiarities occurring in a single larva.

In the fall of 1913, the writer collected upwards of one hundred larvæ of our common large firefly, *Photuris pennsylvanica* DeG., in the Arnold Arboretum, adjoining the grounds of the Bussey Institution. These larvæ, ranging from about 13 to 18 mm. long, were in the second and last year of their growth. Under natural conditions they should have pupated in May or June of 1914, and produced adults a few days later, but, owing to the fact that they were kept under artificial conditions, adults emerged in late winter as well as in summer.

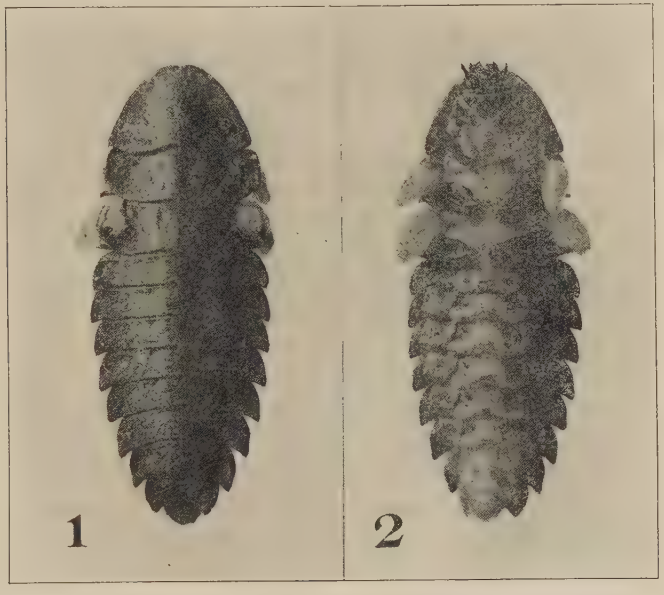


Fig. 1. Prothetelous larva of *Photuris pennsylvanica* De Geer. 1, dorsal view; 2, ventral view.

As secured in the field, these larvæ appeared to be perfectly normal. They were examined from time to time in the laboratory, and on May 27, 1914, an individual was found with a pair of well developed wing-pads on the meso- and metathorax. Two days later another such larva was discovered. Photographs were taken showing the dorsal and ventral view of one of these larvæ anæsthetized with chloroform, and are reproduced above. It will be seen that the wing-buds are here much smaller than the wing-cases of

a pupa, but similarly situated; they are quite symmetrical and are developed just under the heavily-chitinized tergites which they reflex a little. The buds of the metathorax representing the wings are slightly larger than the elytral buds; in one specimen they are almost entirely covered with brown chitin, in the other the buds of the metathorax are largely of a whitish color and their bases show through the tergite as white subcircular areas.

Prothetely has been noted by a number of observers: Heymons (1896)[1] found it in the larva of *Tenebrio molitor;* Busck (1897)[2] observed it in six larvæ of *Anthrenus varius;* Riley (1908)[3] speaks of a prothetelous larva of a pyrochroid beetle, *Dendroides canadensis.* In lepidopterous larvæ Hagen (1872)[4] and others mention the silkworm, *Bombyx mori,* and Kolbe (1903)[5] the Lasiocampid, *Dendrolimus pini.*

As aforesaid, prothetely appears to occur most frequently in the Coleoptera, and Riley[3] offers as an explanation of this, the fact that the wing rudiment in most coleopterous larvæ is according to Tower 'not sharply marked off from the body hypodermis and is usually directly evaginated to form the imaginal organ.' The step from this condition to an external wing-pad would be comparatively simple, which would not be the case in the Lepidoptera and the Diptera for example, for here the wing rudiment is well differentiated from the body hypodermis, for the former is invaginated and thus lies in the body cavity, a condition designated by Tower as the "enclosed type" of wing development.

Inasmuch as all the cases of prothetely noted occur only in larvæ kept under artificial conditions, this accelerated development is probably due in some way to these unnatural conditions. Strickland (1911)[6], is of the opinion that prothetely "is usually caused by keeping larvæ at an abnormally high temperature. This probably results in an increased supply of the enzymes which cause these histoblasts to develop."

Neither larva of *Photuris pennsylvanica* pupated; they lagged behind the other larvæ, being, so to speak, already partly in the

[1] Heymons, R., 1896, Sitzungber. d. Ges. nat. Fr. Berlin, pp. 142-144.
[2] Busck, Aug., 1897, Proc. Ent. Soc. Wash., IV, p. 123.
[3] Riley, Wm. A., 1908, Ent. News, XIX, pp. 136-139.
[4] Hagen, H. A., 1872, Stettin. ent. Ztg., pp. 392-393.
[5] Kolbe, H. J., 1903, Allgem. Zeitsch. für Ent., Bull. 8, No. 1, p. 28.
[6] Strickland, E. H., 1911, Biol. Bull., XXI, pp. 313-327.

pupal stage. One did not attempt to pupate but sickened and died, the second formed a cell in late June and remained therein in an arched position for several days; it approached the form of a pupa, the larval skin softening considerably, and the imaginal eyes could be seen through this integument, but it perished without any ecdysis.

A NEW ANOPHELINE.

By C. S. Ludlow,

Army Medical Museum, Washington, D. C.

The Anopheline to be described is an unusually brilliantly marked one, the very marked spotting of the legs and wings being at once noticeable. It probably lies nearest *ludlowii* but the wing markings are quite different, the palpal bands are all narrow, and the legs are very much more spotted than even the most distinctly marked specimen of *ludlowii* which I have seen.

Myzomyia parangensis sp. nov.

♀. Head brown covered with white and dark brown forked scales, the white ones on the vertex and spreading laterad about one-half the width of the eyes, the brown fork scales on the rest of the head except a long tuft of slender white scales projecting forward between the eyes; antennæ brown, verticels and pubescence white, a few white scales on the proximal joints, basal joint brown with "frosty tomentum"; palpi fairly heavily scaled, the scales outstanding, brown except a small white tip and narrow white bands at the base of the penultimate and at the base of the antipenultimate, the apical joint is very short; proboscis brown, labella light; clypeus brown; eyes brown.

Thorax; prothoracic lobes dark brown with long, yellow bristles; mesothorax a soft yellow, covered with "frosty tomentum" and sparsely by light yellow to white fine hair-like scales, more apparent in a median line of them, and long white scales projecting over the nape, but not confined to the very middle portion. A brown median line widening at the caudal margin, and continued still more broadly on the scutellum; scutellum much as mesonotum; pleura very dark brown with lines of white "frosty tomentum"; metanotum brown.

Abdomen dark brown covered with golden brown hairs, and a few long, light spatulate scales on the apex of the eighth segment; the genitalia are also covered with long spatulate scales.

Legs: coxæ and trochanters white; femora very markedly spotted or ringed in brown and white, there being no marked predominance of either color, the spots

rather large, the very apices light, but sometimes only faintly so; tibiæ like femora, but the apices more distinctly white; the first tarsal joints are also markedly spotted and have an apical white band; the second tarsal joints are both apically and basally banded, more broadly in the fore legs, in the fore and mid legs usually with one intermediate spot, on the hind legs there are several intermediate spots; the third tarsals all have apical and basal light bands and at least one intermediate spot on the hind legs; the fourth tarsals have apical and basal bands, broader on the fore and mid legs, and the hind legs have the intermediate spot; the fifth tarsals are all basally light banded, and in some specimens at least a suggestion of an apical band. Ungues simple and equal. The bandings and spots on the hind tarsals, especially where there are only a few or one spot, divide the legs so they seem quite evenly marked brown and white.

Wings light yellowish much mottled with dark brown. The costa has six brown spots and a mere dot, the last practically at the junction of the first longitudinal vein with the costa; proximad is a small white spot followed by a larger dark one extending on to the first longitudinal and the upper fork of the second long vein, then comes a light spot about three times as long as this second dark spot followed by a small dark spot, about half as long as the preceding dark spot and extending on to the first long vein, then a long light spot followed by the third dark spot which is the largest of all the dark spots, the distal third extending on the sub-costa, the first long vein, on the stem of the second long vein and on the third long vein, the last two veins being less heavily marked than those celphalad of them, there is then on all these veins but the costa a light portion running under the remainder of the costal dark spot until the very proximal end where the dark again extends as a tiny spot on the sub-costa and first long vein. The fourth dark spot is not so long and extends on the sub-costa and first long vein; the fifth dark spot is small, and on the costa only, and the sixth spot is longer but also only on the costa. The wing field is much spotted. A small spot besides the "dot" spoken of on the upper fork of the second long vein near the base of the cell and two on the lower fork, the one near the apex small, and there is one on the stem near the junction of the sub-costa with the costa. The third long vein is mostly light, there being besides the dark spot connected with the large costal spot another dark spot just exterior to it and one near the apex of the vein; the fourth long vein has two spots on the stem and two on each fork; the fifth long vein is mostly light, but has one dark spot on the stem towards the base, and three on its upper fork; the sixth long vein has three dark spots, one near the base, one about the middle, and one near the apex. The fringe is much mottled and is light at the junction of all the veins except the upper fork of the second long vein and at the junction of the sixth, and has also light mid spots between the upper and lower forks of the fifth, between the fifth and the sixth and beyond the sixth it is light save for two dark spots just interior to this vein. The apices of all the veins are light. Halteres with dark knobs and light stems.

Length: about 7 mm.

Habitat: Parang, Mindanao, Philippine Islands.

Taken: October and November.

NOTES ON ASILIDÆ, WITH TWO NEW SPECIES.

By Nathan Banks,

East Falls Church, Virginia.

In the genus *Asilus* Hine has used as diagnostic characters the bristles on hind border of the scutellum and on front side of the hind tibiæ. There are cases where these seem to help very much, but there are so many cases where they mislead that I think a division of the genus on a color character (whether hind femora entirely black or not) is much more useful for our Eastern species. For *A. notatus* but two scutellar bristles have been described, yet in many cases there are four or five, and often three. The tibial bristles are apt to confuse *A lecythus* with *A. paropus*, if one is not familiar with the species.

Asilus autumnalis sp. nov.

Face yellowish, white on the tuberosity, mystax black above and yellowish or yellowish-white below, beard white; antennæ black, third joint with sides more parallel than in *A. novæscotiæ*, bristle full as long as third joint. Thorax with dull black median stripe, indistinctly divided in front, and two spots each side behind, rest with yellowish dust, black hair in front and black bristles behind; scutellum with two bristles on the hind margin; abdomen brown, mostly clothed with yellowish pollen on sides and behind, and yellow hairs all over. Legs with black femora, the tibiæ and metatarsi pale yellowish, with black tips. Wings as in *A. novæscotiæ*. The male forceps are more narrowed at tip than in *A. novæscotiæ*, and the tip more bent downward, so that the lower side is plainly concave. Length, 14–15 mm.

From Falls Church, Va., in August and September.

Our local species of *Asilus* which have the hind femora entirely black may be distinguished as follows:

1. Front and middle femora largely yellow; ovipositor very long . . . *flavifemoratus.*
   Front and middle femora black 2
2. All tibiæ pale only at extreme base; metatarsi black; mystax black and white . . . . . *notatus.*
   Tibiæ with more pale 3
3. Mystax mostly golden, tibia I wholly clear yellow; abdomen black, with white hair, no yellow pile; male forceps furcate at tip . . . . . *orphne.*
   Male forceps not furcate, tibia I not all clear yellow 4
4. Mystax mostly black; hind tibiæ mostly dark; abdomen dark, with pale gray apical margins to segments . . . . . *sadytes.*
   Mystax largely pale 5

5. Mystax mostly white; male appendages not much narrowed nor bent down at tip ..... *novæscotiæ.*
   Mystax whitish or yellowish below, black above; male appendages more curved and narrowed at tip ..... *autumnalis.*

Of *Leptogaster* I have taken most of the Eastern species, and in going over these I am inclined to keep *flavipes* and *favillaceus* as separate, at least as varieties, and would describe a new species. As in *Asilus* I think the color characters are here more valuable than some structural ones, at least more useful than venation.

1. No empodia; hind femora with band before broadest part; hind tibæ with banP at base and at middle dark; thorax pale; antennæ yellow ..... *annulatus.*
   Empodia present 2
2. Hind tibiæ dark only at extreme tip; hind femur usually not plainly banded . . 7
   Hind tibiæ dark for a considerable distance; hind femur dark or dark-banded 3
3. Legs mostly black; antennæ dark; hind legs very slender ..... *tenuipes.*
   Legs mostly pale 4
4. Dorsum of thorax wholly shining black; hind femora with apical dark band, and another over the beginning of the swelling ..... *atridorsalis.*
   Dorsum not wholly shining black 5
5. Thorax with three black stripes; hind femora with band over thickened part; antennæ pale ..... *virgatus.*
   Thorax without such stripes 6
6. Antennæ dark; hind legs short, and the swelling greater than usual, and covered by broad band, the dark of hind tibiæ undivided ..... *pictipes.*
   Antennæ yellow; hind legs longer, the dark band on hind femora not so broad; the dark of hind tibiæ divided by pale ..... *brevicornis.*
7. Thoracic notum polished reddish, often a black spot behind on each side; hind femora with a small dark band 8
   Thoracic notum not polished reddish 9
8. Body mostly reddish ..... *testaceus.*
   Body mostly dark, and with pale marks ..... *badius.*
9. Abdomen yellow on basal part, only dark over the incisures ..... *incisuralis.*
   Abdomen with much more dark 10
10. Abdominal segments dark, pale only near apex; hind femora show a faint dark mark, bristles of thorax black ..... *loewi.*
    Abdominal segments with pale before middle on third, fourth and fifth segments 11
11. Lower anterior bristle of the two thoracic ones pale, larger species with duller marks ..... *favillaceus.*
    Both thoracic bristles dark, marks on abdomen strongly contrasting . . . . *flavipes.*

L. virgatus Coq. probably is *L. carolinensis.* *L. incisuralis* Loew probably is *L. ochraceus.*

Leptogaster loewi sp. nov.

Similar to *L. favillaceus* and *L. flavipes*. Legs pale; hind femora with traces of a dark band over swollen part, tip of hind tibiæ dark. Antennæ yellow; thorax grayish brown above, with traces of median stripes, the two bristles each side black; abdomen grayish brown, tips of third, fourth, and fifth segments yellowish; venation yellowish-brown, as in *L. flavipes*.

Differs from *L. flavipes* (and *favillaceus*) in lacking pale on abdomen before middle of segments, and the more distinct band on hind femora. Length, 10–12 mm.

From Paeonian Springs, Va., 28 June, and Ithaca, N. Y., 7 July.

NOTES ON AULACOPHORA OLIVIER AND OIDES WEBER.

By F. C. Bowditch,
Brookline, Massachusetts.

In the arrangement of my Austral-Malayan species of Aulacophora the following notes occur which may aid in the study of this group.

In Mr. Baly's table of males, Linn. Soc. Journ. vol. xx, p. 2, No. 14 *postica* Chap. is placed in § A_{-B}: it should be in § A_A having the middle anal segment sulcate longitudinally, as stated by him in the description, p. 12, and verified by examination.

Unicolor Jac. cited by Baly l. c., p. 23, states that the ♂ is unknown; the description by Mr. Jacoby, Notes Leyden Mus. vol. v, p. 201, speaks of five specimens, all ♀'s; one of these five examples in the first Jacoby collection is now before me and is a ♂: the middle lobe of the anal segment is slightly concave, placing it in § A_{-B} of Baly's table of ♂'s. Mr. Baly speaks of its resemblance to *Boisduvali* but the anal sulcation seems to me to differ somewhat and needs further comparison. If the two are identical it seems that intermediate forms must occur and I have seen none.

Semilimbata Baly described l. c., p. 74, has no characters given for the ♂; the type specimen apparently came from "New Guinea, (Wallace)"; in the first Jacoby collection among the unnamed material is a ♂ with the same label; the middle anal segment is deeply concave placing the species in Baly's A_A.

Denticornis Blackb. seems to me to be the same as *fraudulenta Jac.* The peculiarities of the two first joints of the ♂ antennæ described by Mr. Blackburn seem to me to be present in the ♂ type of *fraudulenta* (in my collection) and to have been overlooked

by Jacoby in his description; unless the specimen is held at a certain angle the points spoken of are easily overlooked.

Frontalis, Baly, l. c., p. 182, describes the third joint of the antennæ "twice as broad as long." Comparison with a specimen in my collection labeled "type ex Baly" seems to show the words to be accidentally transposed so they should read "twice as long as broad."

Borrei Baly (pectoralis Jac) is described as having the thorax impunctate (Ann. Mus. Gen. 1886, p. 50); the types now in my collection all have the surface near the anterior angles punctured, so the description should read, "impunctate except the anterior angles." Mr. Blackburn in describing his *A. Richmondensis* Proc. Zoöl. Soc. N. S. W. vol. v, 1890, p. 360, relies upon Mr. Jacoby's description to separate the two forms, which seem identical; in Mr. Jacoby's second collection he has under the name *pectoralis* specimens from N. S. W. (square purple label) which exactly agree with the description of Mr. Blackburn's species.

A. celebensis Jac. l. c., p. 52, typically has basal and ante-apical spots, what seems an extreme variety, has the elytra entirely black, except for a small flavous spot at the apex, or a slight margin in the middle of the side, the latter very like (flavo-marginata Duv.). All come from Toli-Toli, No. Celebes (Fruhstorfer).

Aulacophora blackburni sp. nov.

Reddish, castaneous, labrum, face and antennæ flavous, mandibles, eyes, tibiæ and tarsi blackish, femora fuscous at apex, the joints 3, 4, 5 of the antennæ dilated in the male like *denticornis Jac.*

Type: 1 ♂ Manila (coll. Bowditch). Length, 5 mm.

Head impunctate with two almost circular, deep fovæ, one on either side of the vertex above the eye, antennæ a little more than half the length of the body, first joint clavate, second joint very small, rounded, with a minute point externally in the middle, third joint in the shape of a long pointed perpendicular tooth, the following two joints broadly dilated acutely pointed at their anterior angles, the following joints elongate nearly equal, thorax twice as broad as long, finely punctured, very sparsely and finely on the disk, sulcation nearly straight, abbreviated on either side, elytra strongly depressed below the base, showing very lightly punctulate, last abdominal segment longitudinally lightly concave or sulcate.

The above specimen was in the second Jacoby collection mixed with examples of *similis* Oliv. *Denticornis* Jac. is the only other species known to me with the peculiar dentate antennal third joint, and this form should be placed next it.

In Nov. Zoölog. vol. i, pp. 299–300, Mr. Jacoby described *Oides unifasciata* and *suturalis*, calling attention to the produced metasternum, imitating to some extent the genus Doryphora, four nearly allied additional forms have occurred and are here made known. Mr. Jacoby further intimates a new genus for his forms, but I have allowed all to remain in Oides for the present: the two Jacoby species and also the new ones are rather more chunky and robust than the other species of Oides and may be almost picked out by the shape alone.

Oides confusus sp. nov.

Convex ovate, shining; head, antennæ and below, mostly black, thorax flavous, elytra reddish fulvous, with a common broad basal black band, not attaining the lateral edge and a large round subapical spot on each elytron black.

♀ with metasternum produced into a well marked obtuse process, last ventral segment obtuse, impressed on either side.

Type ♀ Milne Bay, Br. N. Guinea (coll. Bowditch). Length, 12 mm.

Imitates *O. rubra Blanch.* in size and color, but more convex and wider, antennæ attaining the rear edge of basal black band with the two or three basal joints more or less fulvous, third and fourth equal and longer than the others, head with a few fine punctures and an impressed line on the front, thorax very finely punctulate over its entire surface and all the angles rounded, scutellum smooth, truncate behind, elytra finely punctulate over the entire surface, abdomen edged with rufous spots, the coxæ and base of the femora are also more or less tinged with rufous, probably mixed with *rubra* in many collections.

Oides binotata sp. nov.

Convex, elongate, shining rufous, mouth, eyes, thorax and a large median lateral spot on each elytron black. ♂ and ♀ with metasternum produced into a well-marked obtuse process.

Type: ♂ ♀ Kapour Holl, N. Guinea (Frühstorfer) coll. Bowditch. Length, 11 mm.

Head with a few faint punctures on the front, which is smooth and shining with a faint median line, antennæ reaching the middle of the elytra, thorax shining, faintly impressed on either side, rather strongly, evenly punctured, sides strongly margined, the angles obtuse, the anterior ones slightly reflexed, scutellum with apex obtusely rounded, elytra smooth, shining, oblong, rather strongly and evenly punctate, the sutural margin somewhat thickened posteriorly, the black spot on each elytron is transversely rounded and a trifle nearer the lateral edge than the suture; the metasternum process, with the color easily separate this form.

Oides gahani sp. nov.

Ovate flavous, eyes, antennæ except base, elytra except anterior third, black, the flavous part of the elytra being narrowest at the scutel and from there curved back to meet the lateral margin at about the middle, ♂ and ♀ with metasternum produced into a well marked obtuse process.

2 ♂ 1 ♀ Stephansort, 1 ♂ Milne Bay, Br. N. Guinea. Length, 11 mm.

Type: ♀ Stephansort (coll. Bowditch).

Head faintly and sparingly punctulate with a dark median line, antennæ reaching the middle of the body the scape wholly and second joint partly flavous, thorax shining, impressed on either side of the disk, moderately and unevenly punctulate, obsolete at the sides, which are rounded and slightly reflexed, anterior angles rounded, posterior obtuse, scutel obtusely pointed behind, elytra shining, rather more strongly punctulate, near the base, punctures becoming obsolete and fine as they enter the black space, sutural margin thickened near the apex, entire underside dirty flavous; two of the specimens were in the 2d Jacoby coll. under the name *dimidiatum* Blanch. but the size, shape and metasternal process separate it at once.

Oides femoratus sp. nov.

Smooth, convex, flavous, antennæ, most of the head, under side of the body largely and legs, except the basal two thirds of the femora black, scutellum and margin of the suture fuscous, ♂ with metasternum produced into a well marked obtuse process.

Type: ♂ Cooktown (Austral.) (square dark blue paper label) 2 spec. (unnamed in 2d Jacoby coll.) (coll. Bowditch). Length, 9 mm.

Head with a few fine punctures and impressed line on the front like *confusus* (*vide supra*), mouth yellow, antennæ reaching the middle of body, the scape more or less rufous, thorax smooth, shining, faintly impressed on the disk, very faintly punctulate, anterior angles rounded, posterior obtuse, sides margined and faintly explanate, scutellum large very obtusely rounded at apex, elytra convex, everywhere faintly and evenly punctulate, the extreme sutural edge thickened, under side mostly shining black, with the pro and mesothorax somewhat flavous, and coxæ and trochanters more or less yellow, legs black except the basal two thirds of the femora; the color of the legs and the metosternal process (which is black) easily distinguish this form, the upper color makes the species resemble *suturalis* Jac. from New Guinea.

SOME COMMENTS ON THE VALUE OF WARNING COLORS AND MIMICRY IN INSECTS.

By C. H. Richardson,
New Jersey Agricultural Experiment Station, New Brunswick, N. J.

During the course of an extended field trip through Nevada and eastern California several years ago, I had an opportunity to make some observations on the feeding habits of certain amphibians and reptiles. As several of these observations throw light upon the protective value of warning colors and mimicry in insects, they are given in the hope that they will be a real contribution, even though a meager one, to these disputed questions.

In the region about Pyramid Lake, Nev., the fleet-footed grid-iron-tailed lizard (*Callisaurus ventralis* Hallowell) was very abun-

dant. Examination of the stomach contents of a number of these lizards showed that their normal food was composed of various insects and bits of tender plant foliage. I was however, quite surprised to find in the stomach of one adult male, shot at Derby, Nev., two wasps so conspicuously banded as to place them unmistakably in the category of insects possessing warning colors. One had black and yellow bands on the thorax and abdomen, the other black and gray-white bands on the abdomen. Another wasp in a partially disintegrated condition, one insect larva, other insect fragments, a number of green leaves and a few pebbles furnished the bulk of the stomach ingredients. The whole mass of food had begun to decompose and the colors of the insects were considerably dimmed. It is evident here that a mature lizard (with full adult colors and testes enlarged) did not discriminate between conspicuously banded stinging insects and a harmless white larva. As further evidence that *Callisaurus* shows no aversion to bright colors, I may add that small, vivid purple flowers were found in the stomach of one individual. Merriam [1] states that blossoms form a considerable part of the food of this species and although he does not give the colors of the blossoms, it is fair to assume that a comparatively large number are brilliantly colored, as brilliantly colored flowers grow abundantly throughout the habitat of *Callisaurus*.

At Tallac, Lake Tahoe, Cal., I watched a large adult leopard frog (*Rana pipiens*), on one occasion for a considerable length of time. I was concealed so that I could observe the actions of the frog, yet it could not see me. In the course of its wanderings over a grassy meadow, the frog captured an insect which was taken into its mouth, ejected, taken into its mouth again and finally discarded. The insect proved to be a drone fly, closely resembling certain species in the Syrphid genus, *Eristalis*. The first abdominal segment of the fly bore two conspicuous yellow triangular-shaped markings, the apices of which did not quite meet mediodorsally. Here, then, we have a mimicking insect whose form and vivid color pattern combined were not of sufficient warning significance to ward off an insectivorous enemy. Just why the frog refused to eat the fly is not quite clear, possibly it was distasteful, but it is certain that the fly was mutilated beyond recovery.

[1] N. A. Fauna No. 7, 1893, p. 172.

EXCHANGE COLUMN

Will name and return species in certain families of Coleoptera. Buprestidæ especially desired.—C. A. Frost, 26 Pond Street, South Framingham, Mass.

Wanted. Insects from ant-nests, with specimens of the ants, from any part of the world. Will give Coleoptera, Diptera and Hymenoptera from the Western United States.—W. M. Mann, Bussey Institution, Forest Hills, Mass.

Will exchange for Geometridæ from any section of North America, or identify material for privilege of retaining examples.—L. W. Swett, 501 Washington Street, Room 44, Boston, Mass.

Will exchange insects of various orders for Parasitic Hymenoptera from any part of the world.—C. T. Brues, Bussey Institution, Forest Hills, Mass.

Wanted. Ants from all parts of the world.—W. M. Wheeler, Bussey Institution, Forest Hills, Mass.

I pay cash or give American and exotic insects in exchange for fertile eggs of Catocala spp., *living* Catocala ♀ ♀ (captured specimens only), hibernating pupæ and larvæ of any other group of Lepidoptera.—William Reiff, 366 Arborway, Jamaica Plain, Boston, Mass.

Florida insects of all orders, also Fish, Batrachians, Reptiles, Shells and Marine Invertebrates sold by A. G. Reynolds, Gulfport, Florida.

New England Orthoptera identified. I wish to examine adult orthoptera of all families from all parts of New England. Material will be identified for the privilege of retaining desired examples, for which good exchanges will be given, subject to approval of owner.—A. P. Morse, Wellesley College, Wellesley, Mass.

The undersigned will greatly appreciate receiving records of New Jersey species not listed in Smith's Insects of New Jersey.—Harry B. Weiss, 272 Hale St., New Brunswick, N. J.

Offered for cash, but exchange preferred. Fitch and early Illinois reports; Insect Life; Harris's Insect; many others.—J. E. Hallinen, Cooperton, Okla.